3 January 1952

TASK OUTLINE

FOR THE

RESEARCH AND DEVELOPMENT

OF THE

( ) [redacted] EQUIPMENT

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SUBMITTED BY [redacted]

CHECKED BY:

APPROVED BY:

TASK OUTLINE FOR (/) [ ] EQUIPMENT

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I. AIM:

The aim of this task is the production of working prototype models, design information and complete manufacturing drawings and specifications for facsimile cyphering equipment to be used as supplementary units with the FT-159 and FR-160 facsimile transmitting and receiving equipment.

II. NOMENCLATURE:

The assigned nomenclature of this equipment shall be ( ). Preliminary engineering models will be assigned the nomenclature ( ) 2, 3, etc., as may be necessary.

III. DISCUSSION OF THE TASK:

The task is to be conducted in two separate and distinct phases; a study phase and a design phase.

A. The study phase is to be consumated prior to the initiation of the design phase and will include the following:

1. A brief summary of basic facsimile mechanisms and modes of transmission including a study of the Faxcard Transmitter FT-159 and the Faxcard Receiver FR-160.

2. Investigation of the degree of privacy obtainable in equipment designed or manufactured to date.

3. Adaptability of telephonic privacy systems now in existence or under development.

4. Evaluation of means for cryptanalysis of various graphic systems an enemy may use.

5. A theoretical study of the feasibility of reducing the number of picture elements to the number of white to black and black to white conditions, with facilities for representing the duration of each condition, and proceeding from that point with a cyphering device. A positive pulse is to represent in amplitude the duration of a black signal and a negative pulse is to represent in amplitude the duration of a white signal. The resulting pulses to be fed into suitable storage facilities, transposed, and keyed out at a frequency consistent with the transmission medium in use. The reduction in picture elements by approximately 80% of the number possible in a conventional transmission is to simplify the problem of cyphering and, at the receiving end, offer excellent controll over recording speeds. Further study of recent developments in signal storage phenomena, magnetic delay systems, and compression-expansion techniques should be made toward adapting the above to high speed burst transmission.

6. A theoretical study of keying devices of which the probability of repetition will be one in ten million. The feasibility of incorporating within the transmitter facilities for manufacturing one shot keys on photo-magnetic film should also be studied.

7. A suggested design of the most useful type of equipment for both privacy transmission and cryptanalysis, keeping in mind the urgent need for speed and versatility.

The study phase will be concluded by the submission of a report discussing the items above, the advantages and disadvantages of each type of equipment studied, and recommendations as to the best type, or types in combination, with substantiating evidence as to the choice. The report will also include the theoretical studies requested in 5 and 6 above with evidence of feasibility or non-feasibility.

Should the study phase indicate that technical or economic conditions obviate the possibility of manufacturing a device meeting the requirements outlined below, the reasons, limitations, and conditions shall be fully discussed in the report.

B. The engineering design phase will be initiated upon demonstration of the feasibility of the design selected.

The purpose of the design phase is to provide all necessary design data, information, drawings, material lists, specifications, tolerances, and test procedures necessary to the manufacture of a preliminary engineering model of the equipment meeting the enumerated requirements as stipulated. The design phase is to be subdivided into the following periods.

Period 1. Preliminary Design.-This shall be a paper design of the equipment, based upon the results of the study phase and aimed at producing a set of drawings and specifications for the construction of the engineering model. Preliminary tests of components or units of the system shall be conducted to verify their suitability for the application. At the conclusion of this period the design and data will be checked and evaluated by representatives of the Government.

Period 2. Engineering Model Construction and Tests.-During this period an engineering model shall be constructed, and complete tests shall be performed in accordance with the specification. The test shall be viewed and/or reviewed by representatives of the Government. The satisfactory completion of the specification tests shall precede the submission of the model to the Government for preliminary operational tests at Government operated laboratories.

Period 3. Production Prototype Design.-Upon completion of Government operational tests, estimated to require approximately thirty days, the Government may require changes or modifications in the equipment prior to production. The desired changes or modifications shall be transmitted in writing to the contractor

who shall incorporate such changes into the design of the production prototypes. This period shall encompass all design changes necessary to producing a complete set of manufacturing drawings suitable for reproduction, a bill of material of all nonfabricated parts and components including data as to capacity, tolerance, formula, composition, or definition, as may be required for purchasing. The manufacturer, or supplier, shall be identified, and the cost in some unit quantity shall be stated. Complete manufacturing instructions where applicable shall be included, as well as complete tests procedures for prototypes tests and production tests. The submission of a report giving the above requested information, drawings, the complete revised specification, and two prototypes meeting the specification shall terminate the task. Acceptance tests of the two prototypes shall be conducted by the Government engineers at a Government test facility if available.

IV: PRODUCT REQUIREMENTS:

A. The controlling factors of this product design are in the following sequence of importance:

1. Reliability
2. Time lag (Time sacrificed between scanning and actual recording.
3. Convenience (Operation, instrumentation)
4. Portability (Size and weight)

B. The specific requirements of the final product are enumerated below and shall act as a major influence on the preliminary studies and designs:

1. Shall consist of two identical compact units with switching facilities which will enable either unit to be used as a coder or decoder. 50X1

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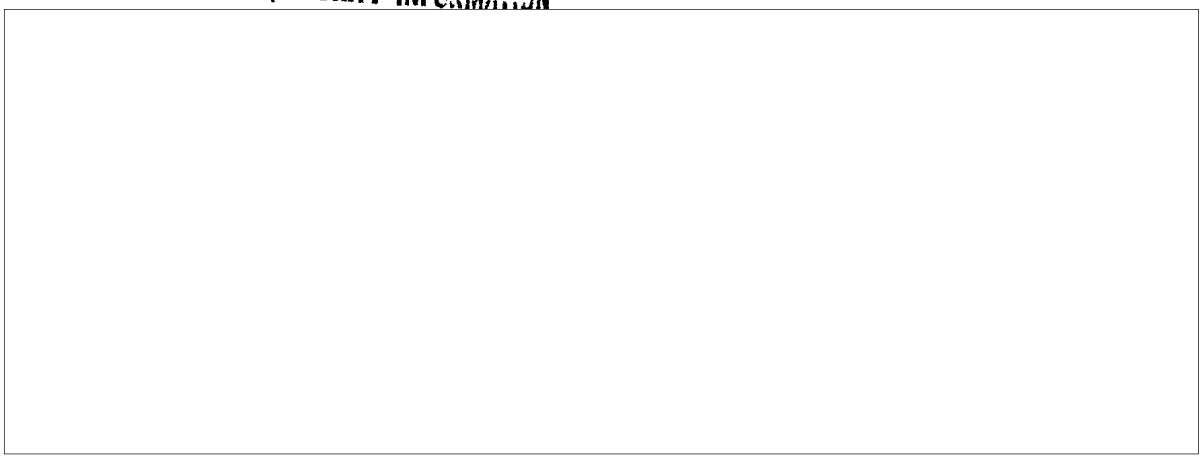
3. Shall include or be equipped with facilities for automatic, non-attended operation.



7. The maximum weight shall not exceed 100 pounds. The maximum size should not exceed 17" in depth, 24" in width and 36" in height. Miniaturization shall be employed where practicable.

8. Power requirements of the equipment shall be kept at a minimum with facilities and plug-in points for operating the equipment from a fork or crystal controlled power amplifier.

9. Circuitry and components shall be temperature compensated for stability within ambient temperature limits of 20 and 120 degrees F.

10. Circuitry shall be designed so that upon temporary loss of signal by the decoder, automatic phasing will effect recovery in the equipment with minimum loss in scan lines.

V. TEST PROCEDURE REQUIREMENTS:

The test procedures shall include, as a minimum, such tests as may be required to insure that the equipment meets all of the above requirements.

VI. GOVERNMENT FURNISHED EQUIPMENT AND SERVICES

A. The government will furnish the contractor access to such experimental facsimile cryptanalysis equipment, engineering surveys, studies, etc., as may be useful in bringing the Task to a successful conclusion.

B. The government will provide certification for contractor representatives for necessary liaison with other government agencies. The conduct of such liaison will be directly supervised by the government project officer.